



# What is Project Risk?

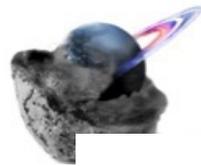
- Project risk is a measure of the potential inability to achieve overall project objectives within defined schedule, technical, and cost constraints
- Risk identification answers the questions:
  - What can go wrong? (failures, accidents)
  - How likely is it? (probability, likelihood)
  - What are the consequences? (severity, impact)
- Risk importance is a function of probability and consequence



## Types of Risks to Consider (and examples)

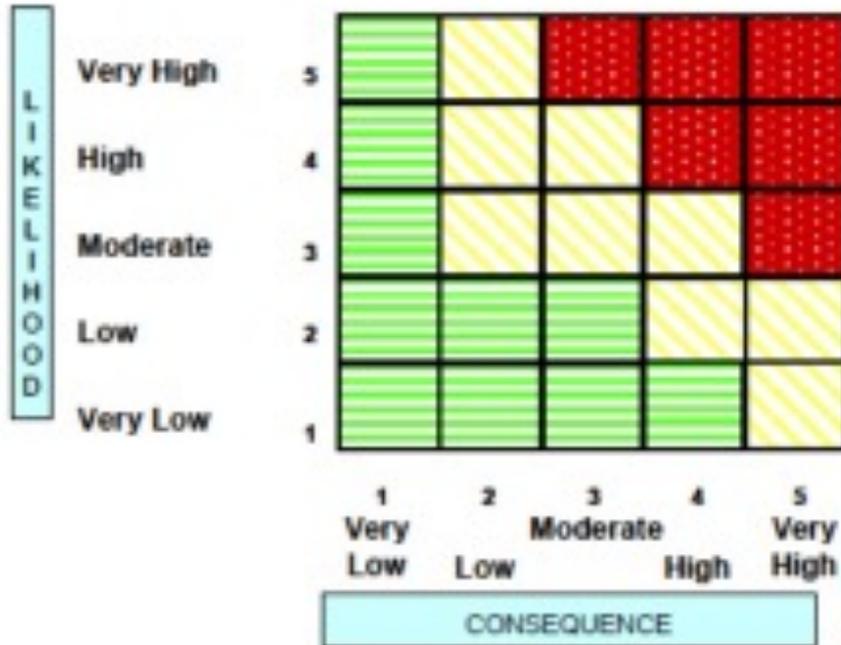
- Technical (performance requirement not met, TRL doesn't advance)
- Supply Chain (supplier doesn't come through, contracts agreed on late)
- Logistics (facility or test equipment aren't available)
- Workforce (resources not available at critical junctures in project)
- Interfaces (not well-defined, unstable)
- Regulatory (license not issued in time, action requires waiver)
- Cost (Exchange rate, labor rate changes)
- Schedule (not enough slack or reserve to deal with the unexpected)
- Partner Contribution (is late, or funding gets canceled)
- Operational (critical deployment failure, lifetime or reliability issues)

*Teams tend to naturally gravitate towards Operational and Technical Risk Categories*



# Risk Assessment

## 5x5 Risk Matrix





NASA  
SAFETY AND MISSION  
ASSURANCE  
REQUIREMENTS

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**NPR 8000.4**  
**Risk Management**  
**Procedural**  
**Requirements**

<b>Likelihood:</b> What is the probability that the situation or circumstance will happen?	
5 (Very High)	Very likely to occur. Project's process cannot prevent this event, no alternate approaches or processes are available. Requires immediate management attention.
4 (High)	Highly likely to occur. Project's process cannot prevent this event, but a different approach or process might. Requires management's attention.
3 (Moderate)	Likely to occur. Project's process may prevent this event, but additional actions will be required.
2 (Low)	Not Likely to occur. Project's process is usually sufficient to prevent this type of event.
1 (Very Low)	Very unlikely. Project's process is sufficient to prevent this event.



# Planning Risk Responses

Identify various response strategies for each risk:

- **Avoid**: Adjust program requirements or constraints to eliminate or reduce the risk -- could be accommodated by a change in funding, schedule, or technical requirements
- **Mitigate**: Implement actions to minimize the impact or likelihood of the risk
- **Transfer**: Reassign organizational accountability, responsibility, and authority to another stakeholder willing to accept the risk
- **Accept/Assume**: Acknowledge the existence of a particular risk, and make a deliberate decision to accept it without engaging in special efforts to control it – requires approval of sponsor

*The first two are more common risk responses*



## Risk Table Example:

Risk ID	Risk	Risk Assessment		Likelihood & Consequence Evaluation	Cost Impact	When retired	
		C	L				
S	1	If S/C cannot be delivered to Launch facility on schedule, secondary launch opportunity is lost	2	1	Consequence: Encumber reserves to pay for more expensive backup launch opportunity (\$5M) Likelihood: Unlikely (10%) given funded schedule reserves and slack before need date	\$500k	FRR
	2	If license for expanded downlink RF bandwidth not granted, then need more contacts with ground station(s)	1	2	Consequence: 50% increase in ground station ops costs (\$500k); no science data lost Likelihood: Possible (30%)	\$150k	KDP-C
O	3	If attitude control fails, then S/C control is lost	1	2	C: very minimal: No science impact, cost impact for recovery \$100k in labor (4 WM) L: Likely (50%) – similar ACS problems have occurred on comparable missions	\$50k	End of Mission

S = Schedule Risk  
 R = Regulatory Risk  
 O = Operational Risk

*This table only captures your top risks*

*Narrative should explain why/how other risks were eliminated*